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STERNE, KESSLER, GOLDSTEIN & FOX PLLC  
1100 NEW YORK AVENUE, N.W.  
WASHINGTON, DC 20005

EXAMINER

SHORTLEDGE, THOMAS E

ART UNIT PAPER NUMBER

2654

DATE MAILED: 09/12/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

10/084,503

Applicant(s)

THYSSEN ET AL.

Examiner

Thomas E. Shortledge

Art Unit

2654

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-44 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-3, 6-13, 17-20, 23-25, 28-35 and 39-42 is/are rejected.
- 7) ☒ Claim(s) 4, 5, 14-16, 21, 22, 26, 27, 36-38, 43 and 44 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 04/17/2002 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

## Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                        | 4) <input type="checkbox"/> Interview Summary (PTO-413)                     |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)               | Paper No(s)/Mail Date. ____.  |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date <u>See Cont. Sheet</u> .   | 6) <input type="checkbox"/> Other: ____.                                    |

07/25/2003  
10/14/2003  
02/28/2005

## **DETAILED ACTION**

### ***Claim Objections***

1. Claims 4, 5, 14-16, 21, 22, 26, 27, 36-38, 43 and 44 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

### ***Claim Rejections - 35 USC § 103***

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claim 1-3 and 23-25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Marcellin et al. (A Trellis-Search 16 KBIT/SEC Speech Coder with Low-Delay) in view of Cuperman et al. (4,963,034).

As to claims 1 and 23, Marcellin et al. teach:

a method for performing an efficient excitation quantization corresponding to a residual signal using a codebook in a speech or audio noise feedback coding (NFC) system, the NFC system including at least one noise feedback loop, the codebook

including N vector quantization (VQ) codevectors, where N is an integer greater than one (Figure 1 depicts a Noise Feedback Coding Structure);

deriving N correlation values using the NFC system, each of the N correlation values corresponding to a respective one of the N VQ codevectors (providing both long term and short term prediction coefficients within a waveform coding structure, where the coefficients are used to construct the residual to be transmitted, page 48 paragraphs 1-3).

Marcellin et al. do not teach:

combining each of the N correlation values with a corresponding one of N Zero-State energies of the NFC system, thereby producing N minimization values each corresponding to a respective one of the N VQ codevectors; and

selecting a preferred one of the N VQ codevectors based on the N minimization values, whereby the preferred VQ codevector is usable as an excitation quantization corresponding to a residual signal derived from a speech or audio signal.

However, Cuperman et al. teach a vocoder for predicting a speech signal, having an associated reconstruction error (col. 3, lines 48 through col. 4, line 42). In selecting a vector closest to input speech, Cuperman teaches the utilization of zero state and state response error vectors as part of a reconstruction error (col. 8, line 34 through col. 9, line 23).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to combine the teachings of Marcellin et al. with the method for reconstruction error calculation taught by Cuperman et al. to increase speech

reconstruction efficiency by reducing the number of required computations as taught by Cuperman et al. (col. 8, lines 41-45).

As to claim 2 and 24, Marcellin et al. do not teach separately correlating a ZERO-INPUT response of the NFC system with each of N ZERO-STATE responses of the NFC system, each of the N ZERO-STATE responses corresponding to a respective one of the N VQ codevectors.

However, Cuperman et al. teach combining each of the ZERO-INPUT with each of the ZERO-STATE responses for a codevector, (col. 8, lines 40-55).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to combine the teachings of Marcellin et al. with the method for reconstruction error calculation taught by Cuperman et al. to increase speech reconstruction efficiency by reducing the number of required computations as taught by Cuperman et al. (col. 8, lines 41-45).

As to claims 3 and 25, Marcellin et al. teach the residual signal includes a series of residual vectors, the method further comprising performing steps (a), (b), and (c) for each of the residual vectors, thereby, producing an excitation quantization corresponding to each of the residual vectors (a residual signal with vectors, where the residual signal is encoded by its vectors for transmission, page 49, paragraph 4, through page 50, paragraph 2).

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4. Claims 6, 8-13, 28, and 30-35 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cuperman et al. in view of Moo (6,141,640).

As to claims 6 and 28, Cuperman et al. teach:

deriving a correlation term corresponding to one shape codevector by correlating a ZERO-STATE response of the coding system corresponding to the shape codevector, with a ZERO –INPUT response of the coding system (col. 8, lines 40-54).

Cuperman et al. do not teach:

deriving a first minimization value corresponding to the positive codevector associated with the one shape codevector when a sign of the correlation term is a first value; nor

deriving a second minimization value corresponding to the negative codevector associated with the one shape codevector when the sign of the correlation term is a second value.

However, Moo teaches deriving minimization values in accordance with the codebook for transmission depending on the sign of the codevector (col. 3, lines 41-57).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to combine the teachings of Cuperman et al. with the methods of Moo to create a transmission system operating at a lower bit rate, as taught by Moo, (col. 2, lines 11-19).

As to claims 8 and 30 Cuperman et al. do not teach:

performing steps (a), (b), and (c) for each of the shape codevectors, thereby deriving for each shape codevector either a first minimization value corresponding to the positive codevector or a second minimization value corresponding to the negative codevector;

selecting a preferred codevector from among the positive and negative codevectors corresponding the minimization values derived in steps (a) and (b) based on the minimization values, whereby the preferred codevector is usable as an excitation quantization corresponding to a residual signal derived from a speech or audio signal.

However, Moo teaches assigning a minimization value to the codevector based on its sign, and selecting a codevector from among the positive and negative codevectors to be corresponding to the error term of the inputted speech, (col. 3 lines 20-65).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to combine the teachings of Cuperman et al. with the methods of Moo to create a transmission system operating at a lower bit rate, as taught by Moo, (col. 2, lines 11-19).

As to claims 9 and 31, Cuperman et al. do not teach selecting, as the preferred codevector, the positive or negative codevector corresponding to a minimum one of the minimization values.

However, Moo teaches assigning a minimization value to the codevector based on its sign, and selecting a codevector from among the positive and negative



codevectors to be corresponding to the error term of the inputted speech, (col. 3 lines 20-65).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to combine the teachings of Cuperman et al. with the methods of Moo to create a transmission system operating at a lower bit rate, as taught by Moo, (col. 2, lines 11-19).

As to claims 10 and 32, Cuperman et al. do not teach a series of residual vectors, the method further comprising performing steps (a) through (e) for each of the residual vectors, thereby producing an excitation quantization corresponding to each of the residual vectors.

However, Moo teaches an error vector, where the error vectors are quantized, (col. 3, lines 34-40).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to combine the teachings of Cuperman et al. with the methods of Moo to create a transmission system operating at a lower bit rate, as taught by Moo, (col. 2, lines 11-19).

As to claims 11 and 33, Cuperman et al. do not teach:

deriving the first minimization value corresponding to the positive codevector when the sign of the correlate term is negative; nor

deriving the second minimization value corresponding to the negative codevector when the sign of the correlation term is positive.

However, Moo teaches determining the minimization values based on the sign of the codevector (col. 3, lines 35-58).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to combine the teachings of Cuperman et al. with the methods of Moo to create a transmission system operating at a lower bit rate, as taught by Moo, (col. 2, lines 11-19).

As to claims 12 and 34, Cuperman et al. teach deriving the ZERO-INPUT response of the coding system, and deriving the ZERO-STATE response of the coding system (col. 8, lines 40-55).

As to claims 13 and 35, Cuperman et al. teach deriving, from the ZERO-STATE response, a ZERO-STATE energy corresponding to the one shape codevector, wherein step (b) and step (c) each comprise combining the ZERO-STATE energy with the correlation term to produce the respective minimization values (find the ZERO-STATE response to the previous vectors, and finding a minimization term based on the ZERO-STATE response, col. 8, lines 40-57).

5. Claims 7 and 29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cuperman et al. in view of Moo as applied to claims 6 and 28 above, and further in view of Marcellin et al.

As to claim 7 and 29 Cuperman et al. teach the utilization of zero state and state response error vectors as part of a reconstruction error (col. 8, line 34 through col. 9, line 23).

Cuperman et al. in view of Moo do not teach a noise feedback coding (NFC) system including at least one noise feedback loop, and deriving the correlation term.

However, Marcellin et al. teach a NFC system (Fig. 1) with a prediction element.

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to combine the teachings of Cuperman et al. in view of Moo, with the NFC system of Marcellin et al. to create a coding system with a lower complexity as taught by Marcellin et al. (page 54, paragraph 2).

6. Claims 17 and 39 are rejected under 35 U.S.C. 103(a) as being unpatentable over Marcellin et al. in view of Moo.

As to claims 17 and 39, Marcellin et al. teach:

a method of searching a codebook in a speech or audio noise feedback coding (NFC) system, the NFC system including at least one noise feedback loop, the codebook including a plurality of shape codevectors each (a noise feedback coding

system with a prediction element, for searching a codebook, page 48, paragraph 3, and page 49, paragraph 3 through page 50, paragraph 2);

deriving a correlation term corresponding to the shape codevector using at least one filter structure of the NFC system (a pitch predictor, outputting correlation coefficients, page 51, paragraph 3).

Marcellin et al. do not teach:

deriving a first minimization value corresponding to the positive codevector associated with the shape codevector when a sign of the correlation term is a first value; nor

deriving a second minimization value corresponding to the negative codevector associated with the shape codevector when a sign of the correlation term is a second value; nor

selecting a preferred codevector from among the positive and negative codevectors corresponding to minimization values derived in steps (b) and (c) based on the minimization values.

However, Moo teaches creating minimization values corresponding to the sign associated with the a value of the error term, the sign of the corresponding codevector being positive or negative. A codevector is then selected based on the selected minimization value (col. 3, lines 24-48, and 40-50).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to combine the methods taught by Marcellin et al. with the

teachings of Moo to create a transmission system operating at a lower bit rate, as taught by Moo, (col. 2, lines 11-19).

7. Claims 18-20 and 40-42 are rejected under 35 U.S.C. 103(a) as being unpatentable over Marcellin et al. in view of Moo as applied to claims 17 and 39 above, and further in view of Cuperman et al.

As to claims 18, 19, 40 and 41, Marcellin et al. and Moo do not teach a ZERO-STATE response of the NFC system corresponding to the shape codevector, a ZERO-INPUT response of the NFC system, deriving, from the ZERO-STATE response, a ZERO-STATE energy corresponding to the shape codevector, nor wherein step (b) and step (c) each comprise combining the ZERO-STATE energy with the correlation term to produce the respective minimization value.

However, Cuperman et al. teach a vocoder for predicting a speech signal, having an associated reconstruction error (col. 3, lines 48 through col. 4, line 42). In selecting a vector closest to input speech, Cuperman teaches the utilization of zero state and state response error vectors as part of a reconstruction error (col. 8, line 34 through col. 9, line 23).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to combine the teachings of Marcellin et al. with the teachings of Moo, with the method for reconstruction error calculation taught by Cuperman et al. to

increase speech reconstruction efficiency by reducing the number of required computations as taught by Cuperman et al. (col. 8, lines 41-45).

As to claims 20 and 42 Marcellin et al. teach producing a preferred codevector usable as an excitation quantization corresponding to each of the residual codevectors (quantizing and transmitting the residual, page 49, paragraph 4).

***Allowable Subject Matter***

8. The following is a statement of reasons for the indication of allowable subject matter:

As to claims 4 and 26 the prior art of record does not teach nor fairly suggest in combination of claims 3 and 25, for each of the residual vectors in the series of successive residual vectors, searching the codebook using the N invariant ZERO-STATE responses.

As to claims 5 and 27, the prior art of record does not teach nor fairly suggest in combination of claims 3 and 25, for each of the residual vectors in the series of successive residual vectors, searching the codebook using the N invariant ZERO-STATE energies.

As to claims 14 and 36, the prior art of record does not teach nor fairly suggest in combination of claims 13 and 35 deriving the minimization value by adding the correlation term to the ZERO-STATE energy; and deriving the minimization value by subtracting the correlation term from the ZERO-STATE energy.

As to claims 16 and 38, the prior art of record does not teach nor fairly suggest in combination of claims 8 and 30:

a shape code,  $C_{\text{shape}} = \{c_1, c_2, c_3, \dots, c_{N/2}\}$ , including  $N/2$  shape codevectors  $c_n$ , and

a sign code,  $C_{\text{sign}} = \{+1, -1\}$ , including a pair of oppositely-signed sign values  $+1$  and  $-1$ , such that the positive codevector and the negative codevector associated with each shape codevector  $c_n$  each represent a product of the shape codevector and a corresponding one of the sign values, and

wherein step (e) comprises selecting a shape codevector and a corresponding sign value corresponding to the preferred codevector, based on the minimization values.

As to claims 21 and 43, the prior art of record does not teach nor fairly suggest in combination of claims 18 and 40 searching the codebook using the plurality of invariant ZERO-STATE responses for each of the residual vectors in the series of successive residual vectors.

As to claims 22 and 44, the prior art of record does not teach nor fairly suggest in combination of claims 18 and 40 searching the codebook using the plurality of invariant ZERO-STATE energies for each of the residual vectors in the series of successive residual vectors.

### ***Conclusion***

9. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. See PTO-892.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thomas E. Shortledge whose telephone number is (571)272-7612. The examiner can normally be reached on M-F 8:00 - 4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Richemond Dorvil can be reached on (571)272-7602. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



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**RICHEMOND DORVIL**  
**SUPERVISORY PATENT EXAMINER**